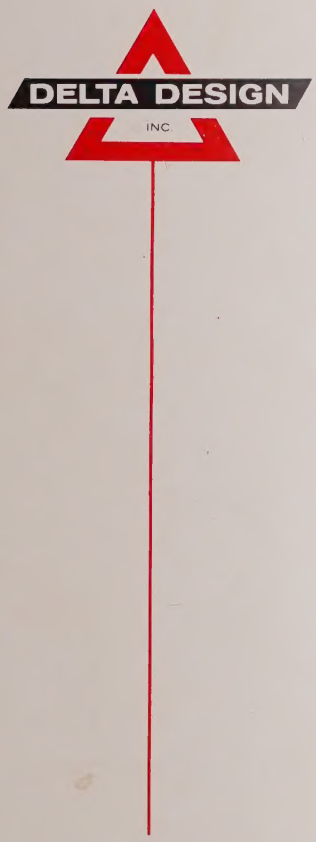
2300
TEMPERATURE CHAMBER
MANUAL



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ENVIRONMENTAL CONTROL EQUIPMENT FOR RESEARCH AND INDUSTRY

2300
TEMPERATURE CHAMBER
MANUAL

DELTA DESIGN INC

5725 KEARNY VILLA ROAD, SAN DIEGO, CALIFORNIA - TEL (714) 292-5000 - TWX: (910) 335-1215 - CABLE: DELTA

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2300 SPECIFICATION SHEET

AIR CIRCULATION: 140 CFM centrifugal blower with baffling to provide equal distribution throughout the chamber in a vertical air flow pattern

INNER LINER: Type 18-8 stainless steel

OUTER CASE: Aluminum

EXTERNAL FINISH: Grey, pebble enamel

INSULATION: Fiberglass

WEIGHT: 60 lbs

POWER REQUIREMENT: 1.520 KW, 120V 60 cycle single phase AC

CONTROLS: Power ON-OFF switch and indicator light, COOL ON-OFF switch and indicator light, HEAT ON-OFF switch and indicator light, temperature set point control, local or remote control switch (Mode)

HEATING ELEMENTS: Dual 720 W elements to give total of 1440 Watts nichrome wire

COOLING: Liquid CO_2 metered injection (1050 psi standard, 300 psi optional) or liquid nitrogen (100 psi)

PROGRAMMING: Chamber requires no modification

CONTROLLER:

Type: Solid - state, time proportioning
Control fluctuations: $\pm 0.1^{\circ}F$

TEMPERATURE RANGE: $-100^{\circ}F$ to $+600^{\circ}F$ ($-300^{\circ}F$ to $+600^{\circ}F$ for LN_2 models)

CONTROLLER TEMPERATURE ACCURACY:

$-100^{\circ}F$ to $0^{\circ}F$ $\pm 4^{\circ}F$
$0^{\circ}F$ to $+100^{\circ}F$ $\pm 2^{\circ}F$
$+100^{\circ}F$ to $+425^{\circ}F$ $\pm 1^{\circ}F$
$+425^{\circ}F$ to $+600^{\circ}F$ $\pm 3^{\circ}F$

CONTROLLER DEAD-BAND: $3^{\circ}F$

LINE VOLTAGE STABILIZATION: $\pm 0.25^{\circ}F$ for 105 to 125 V, AC 60 cycle line voltage change

AMBIENT TEMPERATURE COMPENSATION: $\pm$ 0.010°F/°F

HEAT LOAD COMPENSATION: $\pm$ 0.040°F/watt

GRADIENT IN TEST AREA (1-1/2" from walls in corners and in the center of the test area): $\pm$ 3/4°F/100°F

THERMAL IMPEDANCE OF CHAMBER: Approximately 1.25°F/watt

SETTLING TIME FROM START OF CONTROL TO WITHIN 1°F OF FINAL TEMPERATURE FROM AMBIENT TEMPERATURE TO 425°F: 15 min.

NULL DETECTOR CONTACT CLOSURE: Temperature will be within 4°F of final temperature at 3 min. after closure occurs. (425°F from ambient start)

NULL DETECTOR CONTACT RATING: 1 amp, 240 V, with contact protection provided by user to protect against inductive loads

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Ordering Replacement Parts

Please include the chamber model number, serial number and the part number as listed in the parts list.

A complete parts list is included as part of this manual.

ILLUSTRATIONS

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2300 CHAMBER

PRECAUTIONS

(1) Connect SAFETY PLUG (rear of chamber) when external programmer is not being used. This will preclude any accidental high temperature being obtained if the MODE switch is placed in the PROGRAM position with no programmer connected.

(2) Unplug the chamber from all sources of power before attempting any type of servicing or removal of the controller chassis. The case of the SCR Switch assembly, located on the controller sub-assembly, is at power line potential and extreme care in servicing or calibration must be exercised.

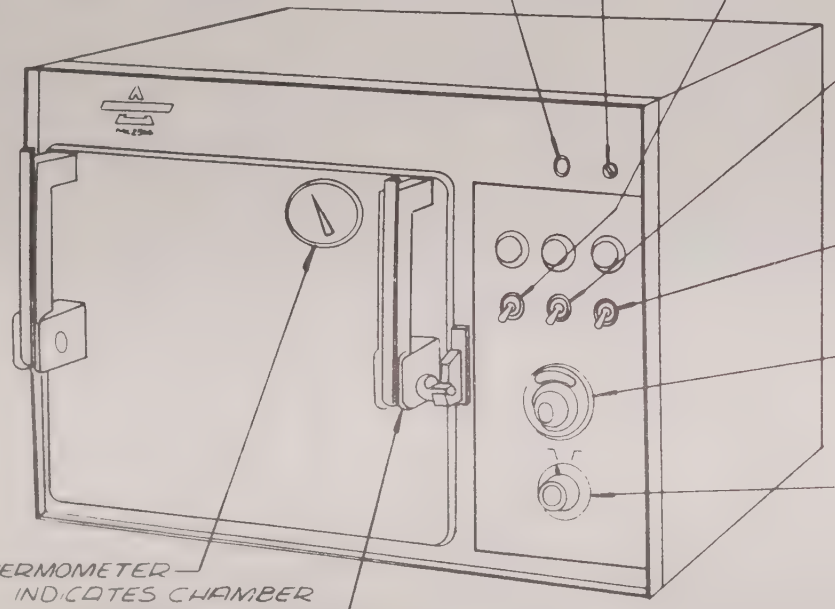
(3) Do not leave liquid nitrogen trapped in a line (valves closed at both ends) as high pressures will be developed as the liquid absorbs heat and becomes gas.

(4) Ensure that the correct type of LCO_2 (liquid carbon dioxide) source is connected to the chamber before operating at low temperature. Test the LCO_2 for cleanliness by discharging a quantity of it through a clean white handkerchief. Bits of rust and traces of oil, ice or water indicate contaminated LCO_2 which should not be used.

(5) Ground the case of the chamber to earth ground. When a grounded outlet is not available, use the three-to-two adaptor (supplied with the chamber) and connect the green colored "pigtail" to earth ground. The chamber must not be operated without the case grounded.

(6) Operate the chamber at a temperature of 400°F for an hour after prolonged operation at low temperatures. This restores the efficiency of the insulating material by driving out the moisture which has been condensed out of the air.

(7) CAUTION - Liquid oxygen may be formed in the insulation when the chamber is operated at temperatures of -297°F and below. Any mixture of oil and liquid oxygen can be explosive. If oil contamination is suspected, bake the chamber out by operating it at a temperature of 400°F for a period of 3 hours before taking it to extremely low temperatures.



FAILSAFE ADJUSTMENT- TURN TO CHANGE TEMPERATURE AT WHICH FAILSAFE WILL TRIP.
CAUTION: DO NOT LOWER FAILSAFE TEMP SETTING UNLESS HEAT SW. IS ON & FAILSAFE IS OFF.

FAILSAFE LIGHT- GLOWS RED WHEN FAILSAFE IS TRIPPED.

THERMOMETER- INDICATES CHAMBER TEMP. IN TEST VOLUME.

CAM ACTION HANDLES: PULL LEVER FULL DOWN TO RELEASE

OPERATING INSTRUCTIONS: INSTALL THE CHAMBER, CONNECT POWER CORD TO SUITABLE OUTLET & COOLANT SUPPLY TO VALVE INLET AT REAR OF CHAMBER.

FOLLOW THE ARROWS.

5. HEAT SWITCH & LIGHT--SWITCH ON--ON POSITION ALLOWS CONTROLLER TO APPLY HEAT AUTOMATICALLY TO MAINTAIN SELECTED TEMPERATURE IN CHAMBER. RED LIGHT IS ON STEADY WHEN CHAMBER IS HEATING. BLINKS WHEN CHAMBER REACHES SELECTED TEMPERATURE ABOVE AMBIENT.

4. COOL SWITCH & LIGHT--SWITCH ON--ON POSITION ALLOWS CONTROLLER TO APPLY COOLANT AUTOMATICALLY TO MAINTAIN SELECTED TEMPERATURE IN CHAMBER. GREEN LIGHT IS ON STEADY WHEN CHAMBER IS COOLING.

3. POWER SWITCH & LIGHT-- SWITCH ON. MAIN POWER ON. WHITE LIGHT GLOWS WHEN POWER IS ON.

2. TEMPERATURE SET DIAL-- SET TO DESIRED TEMPERATURE. SELECTS CHAMBER TEMPERATURE IF MODE SWITCH IS IN MANUAL POSITION.

1. MODE SWITCH-- SET TO MANUAL POSITION. ASSIGNS THE SELECTION OF CHAMBER TEMPERATURE TO TEMPERATURE SET DIAL OR EXTERNAL PROGRAMMER.

MANUAL POSITION: TEMPERATURE SET DIAL DETERMINES CHAMBER TEMPERATURE.

PROGRAM POSITION: PROGRAMMING RESISTANCE CONNECTED TO PROGRAM JACK AT REAR OF UNIT SELECTS CHAMBER TEMPERATURE.

CAUTION: ALWAYS CONNECT SAFETY PLUG (AT REAR OF CHAMBER) WHEN AN EXTERNAL PROGRAMMER IS NOT BEING USED. (SEE PAGE 6)

FIGURE 1

INSTALLATION

Rack mounting models may be used as bench mounted types if a 1/2 inch clearance is maintained underneath to allow the required air flow out the bottom of the chamber. This is necessary for proper controller cooling. The mounting feet on bench models maintain the required clearance. Do not operate the chamber without the required air space beneath it.

POWER CONNECTION

The circuit to which the chamber is to be connected should have a 20 ampere minimum rating. The outlet should be of the polarized type with a "U" grounding slot. Ensure that all switches are OFF and plug the chamber power cord into the outlet. Do not use the 3-wire to 2-wire adapter. Use the adapter only if the outlet is of the non grounding type. The short, green lead (terminating in a clip) should be fastened to the grounding screw securing the cover plate to the outlet. THE CHAMBER MUST BE PROPERLY GROUNDED.

LIQUID COOLANT

Liquid Carbon Dioxide - 1050 psi system

Test the bottle by releasing a small amount of LCO_2 into a white handkerchief. Any brown stain indicates rust which would clog the filter and valve in the chamber. A wet handkerchief indicates water which would either freeze in the valve or clog the injector nozzle. Crack the LCO_2 valve open on the cylinder and notice the spray. It should be a dense, white cloud. It looks thin and gray when the tank is almost empty. An almost empty tank will not give proper cooling and should not be used. Connect the tank of LCO_2 to the rear of the chamber with the supplied high-pressure hose and fittings. Place a small amount of sealing compound on the threads of the male fitting to prevent leakage. DO NOT LET ANY SEALING COMPOUND GET INTO THE VALVE INLET ON THE REAR OF THE CHAMBER. Open the bottle and check for leaks which show as frosty spots on the hose or fittings.

Liquid Carbon Dioxide - 300 psi Low Pressure system

When the in-plant use of liquid CO_2 exceeds approximately 1000 to 2000 lb. per month, a bulk liquid storage system can be installed to reduce the cost of coolant. Chambers being operated with this type of system have to be fitted with a different CO_2 valve and injector than used on a 1050psi system. If new chambers are ordered for use with a bulk storage

300 psi system, the fact should be stated on the order.

NOTE: The bulk storage system should be of the recirculating type if possible. If not, the supply should be located as close as possible to the chamber to minimize gas formation in the supply line. This is particularly important in low volume usage systems as the insulation and fluid flow are the factors that prevent boiling of CO_2 in the supply line. Gaseous CO_2 is not an effective coolant.

All lines, valves and connecting hoses should be blown out before the chamber is connected. Water is very troublesome and is apparently inherent in some low-pressure refrigerated supplies. If lines are opened to bleed off excessive pressure at shutdown, close them to prevent contamination by condensed moisture. This will help to keep ice from forming in the control valve.

LIQUID NITROGEN

Operation to temperatures as low as -300°F is possible with LN_2 as the coolant. The calibration of the TEMPERATURE SET Dial will be somewhat non linear at temperatures lower than -250°F. A temperature in the chamber of -300°F will be obtained with a dial setting of approximately -285°F.

CAUTION

Oxygen in the air surrounding the chamber inner liner and in the insulation can be liquified at temperatures at or below -297°F. This creates an oxygen rich atmosphere surrounding the heater area. The chamber tends to be self purging as the nitrogen replaces the usual atmosphere near the heaters. Any mixture of oil and liquid oxygen can be explosive so that extreme care must be used during operation at very low temperatures.

A 100 psi valve and stainless steel, polyurethane foam insulated, injector assembly is used for the liquid nitrogen applications. LCO_2 from a tank will not operate properly in a chamber equipped for LN_2.

Connect a liquid nitrogen liquid withdrawal container to the LN_2 input of the chamber with an insulated transfer line. A relief valve should be installed in the line with a relief pressure between 60 and 100 psi for a 2700 cu. ft. 50 psi liquid withdrawal container.

SETTING THE DIAL TEMPERATURE INDICATOR

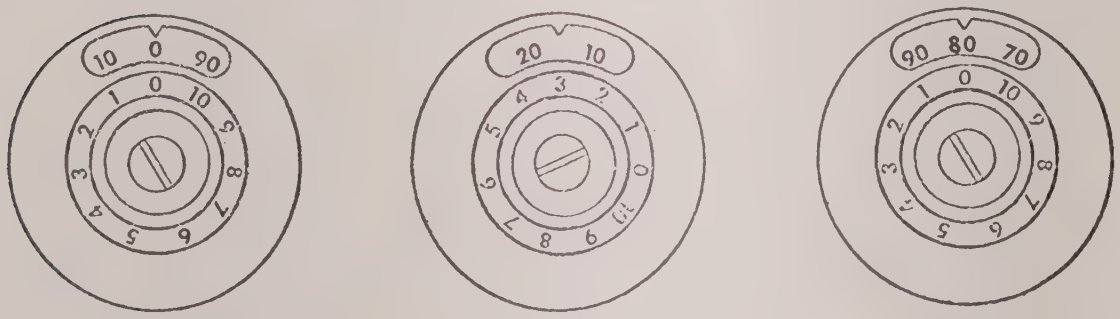
Description

Refer to example A - Set both dials at zero.

One complete rotation of the knob equals 100°. Clockwise is plus (+) degrees (F. or C) and counter-clockwise is minus (-) degrees. Each rotation of the knob is indicated by the small dial nearest the knob.

The large dial indicates each degree, every tenth numbered. Thus, as in example B, the large dial is set at 15, and the small dial is beyond 3, therefore the setting is +315°.

When setting to a minus (-) temperature it is necessary to subtract the degrees from 100, i.e., 20 from 100 equals "80" reading on the large dial to have a setting of -20°. This is shown in example C. It will be noted that the zero on the small dial is just to the left of the marker. Also, on the models having a range greater than -100°, it is necessary to keep track of the counter-clockwise rotation of the knob.



A
(0°)

B
(+315°)

C
(-20°)

FIGURE 2

ADJUSTING THE FAIL SAFE

The Failsafe is adjusted by rotating the slotted FAILSAFE control. The trip temperature is increased by rotating the control counter-clockwise and is lowered by turning the control clockwise. One full turn changes the trip temperature approximately 90°F.

The two recommended procedures for setting the Failsafe are:

(1) Operate the chamber at a known temperature. Read the temperature indication on the thermometer and ensure that the heat switch is in the ON position. Turn the Failsafe adjustment clockwise to lower the setting until the Failsafe Lamp turns on. This establishes the setting of the Failsafe. Estimate the number of turns required of the Failsafe adjustment at 90°F per turn, and rotate the control counter-clockwise to the desired setting.

(2) Operate the chamber at the maximum temperature for the test and adjust the Failsafe control so that the Failsafe is on the verge of tripping.

NOTE: DO NOT ADJUST THE FAILSAFE MORE THAN 1 FULL TURN TOWARDS LOWER TEMPERATURES (CLOCKWISE ROTATION) AFTER THE FAILSAFE LIGHT COMES ON AS THE THERMO-SWITCH UNIT CAN BE DAMAGED BY FORCING.

PROGRAMMING THE 2300 CHAMBER

Connect the correct resistances between pins 1 and 3 of the PROGRAM Jack. Set the MODE Switch to PROGRAM and the HEAT and COOL switches to their ON positions. The controller will apply heat or coolant as needed to obtain the programmed temperature.

A Safety plug is provided with the chamber and should be kept connected to the PROGRAM input whenever an actual programmer or actual resistance is not connected. The safety plug will prevent the chamber from accidently being programmed to a very high temperature if the MODE Switch is placed in the PROGRAM position with an open PROGRAM input.

The safety plug disables the heat and cool circuits of the controller when the MODE Switch is placed in the PROGRAM position.

2300 CHAMBER AND CONTROLLER DESCRIPTION

CHAMBER

The 2300 is a precision environmental temperature test chamber having a stainless steel interior, aluminum outer case and fiberglass insulation. The air circulation is closed and provided by a 140 CFM blower. (See Fig. 3) The chamber is heated by applying full wave power to a pair of bobbin wound nichrome 720 watt heating elements via the heat solid state switch.

The chamber is cooled by injecting liquid CO_2 (liquid nitrogen in the LN_2 models) into the air stream through an expansion nozzle. The coolant flow is metered by a solenoid valve, controlled by the cool solid state switch.

The temperature control system is shown in block diagram form as Fig. 4.

SOLID STATE CONTROLLER

The controller compares the resistance of the temperature probe to the resistance of the TEMPERATURE SET Potentiometer. (The resistance of a remote programming resistor is compared to the probe resistance if the MODE Switch is in the PROGRAM Position.)

The resistance of the probe will always be either less than, equal to, or greater than the resistance of the TEMPERATURE SET Potentiometer (program resistance). These three situations directly correspond to the chamber temperature being lower than, equal to, or higher than desired. The controller applies heat, coolant, or withholds both to obtain and maintain the selected temperature in the chamber.

NOTICE, the controller is a three mode unit, i.e.

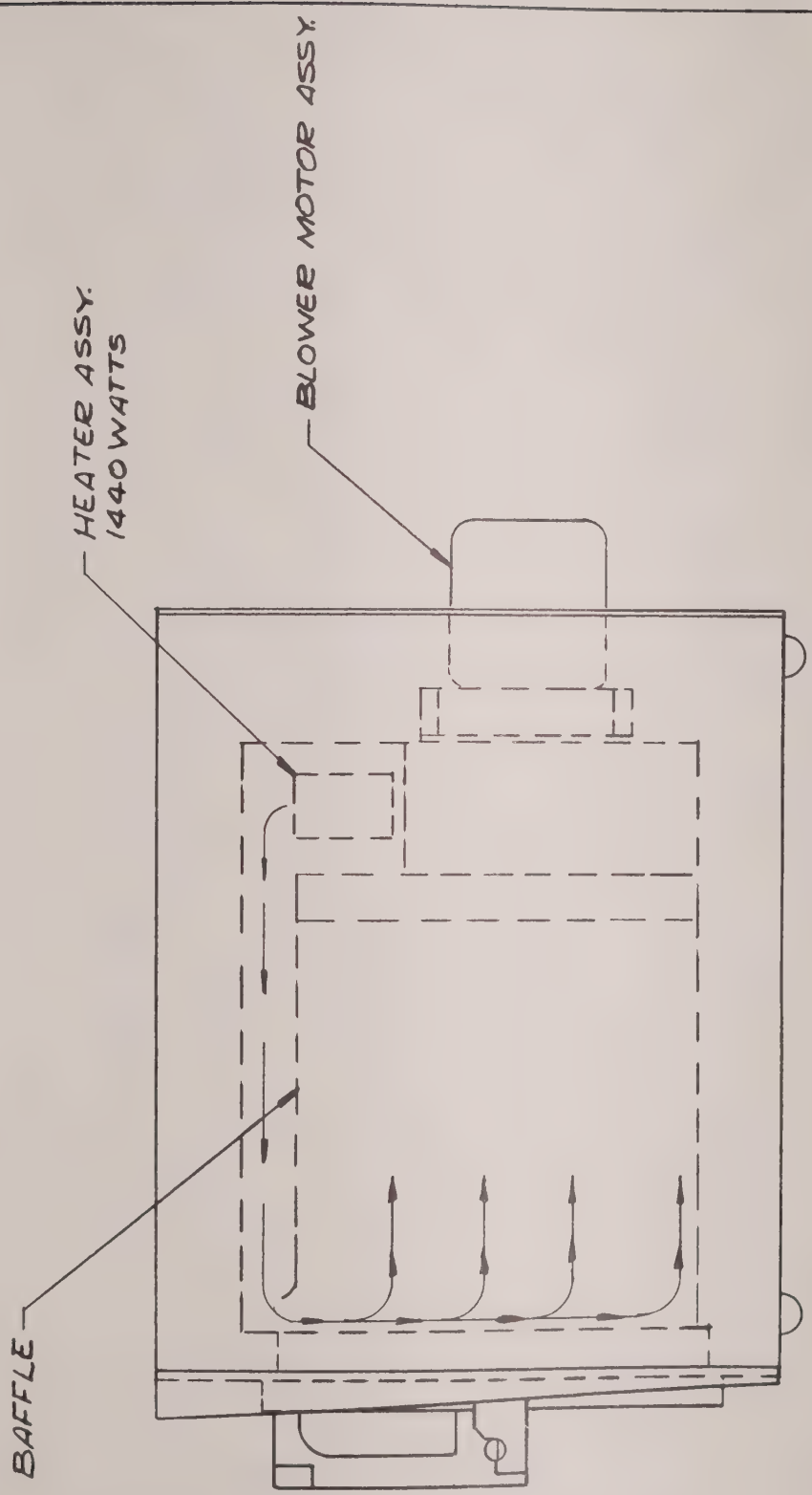
(a) Heat only
(b) No heat or coolant
(c) Coolant only

This mode of control ensures that LCO_2 or LN_2 is not wasted in a continuous cycling of the heaters and coolant valve such as would be the case for a simple two state output controller.

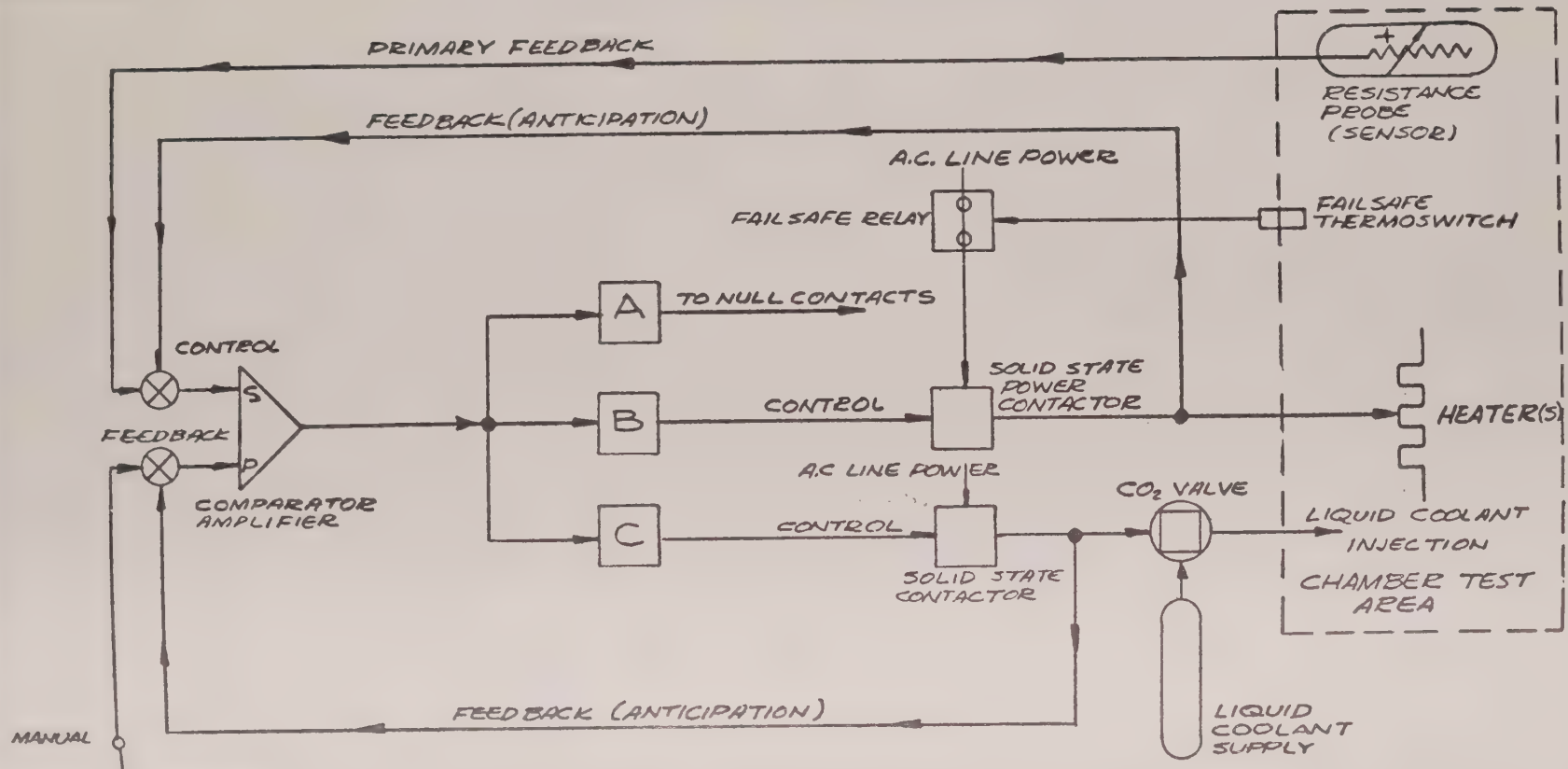
NULL DETECTOR CIRCUIT

A contact closure is provided at the rear when the chamber reaches the indicated SET Point of the controller. This contact closure may be used to signal that the chamber has reached selected temperature.

The Delta Design Model 9307 HI-LO Step Programmer, Model 9311 TEN STEP Programmer, and the Model 9312 HI-LO-AMBIENT Programmer utilize the null contacts to start their timers when they are used with the 2300 chamber. This contact closure feature is most useful in automatic test programming applications.



2300 CHAMBER AIR FLOW PATTERN



TEMPERATURE CONTROL SYSTEM
SOLID STATE, TYPE III
DELTA DESIGN INC.

A = NULL DETECTOR SCHMITT
(REED RELAY OUTPUT)
PRODUCES CONTACT CLOSURE
FOR /P/ = /S/

B = HEAT, SCHMITT
(REED RELAY OUTPUT)
PRODUCES CONTACT CLOSURE
FOR /P/ INPUT AT AMPLIFIER
GREATER THAN /S/

C = COOL, SCHMITT
(REED RELAY OUTPUT)
PRODUCES CONTACT CLOSURE
FOR /S/ GREATER THAN /P/

FIGURE 4

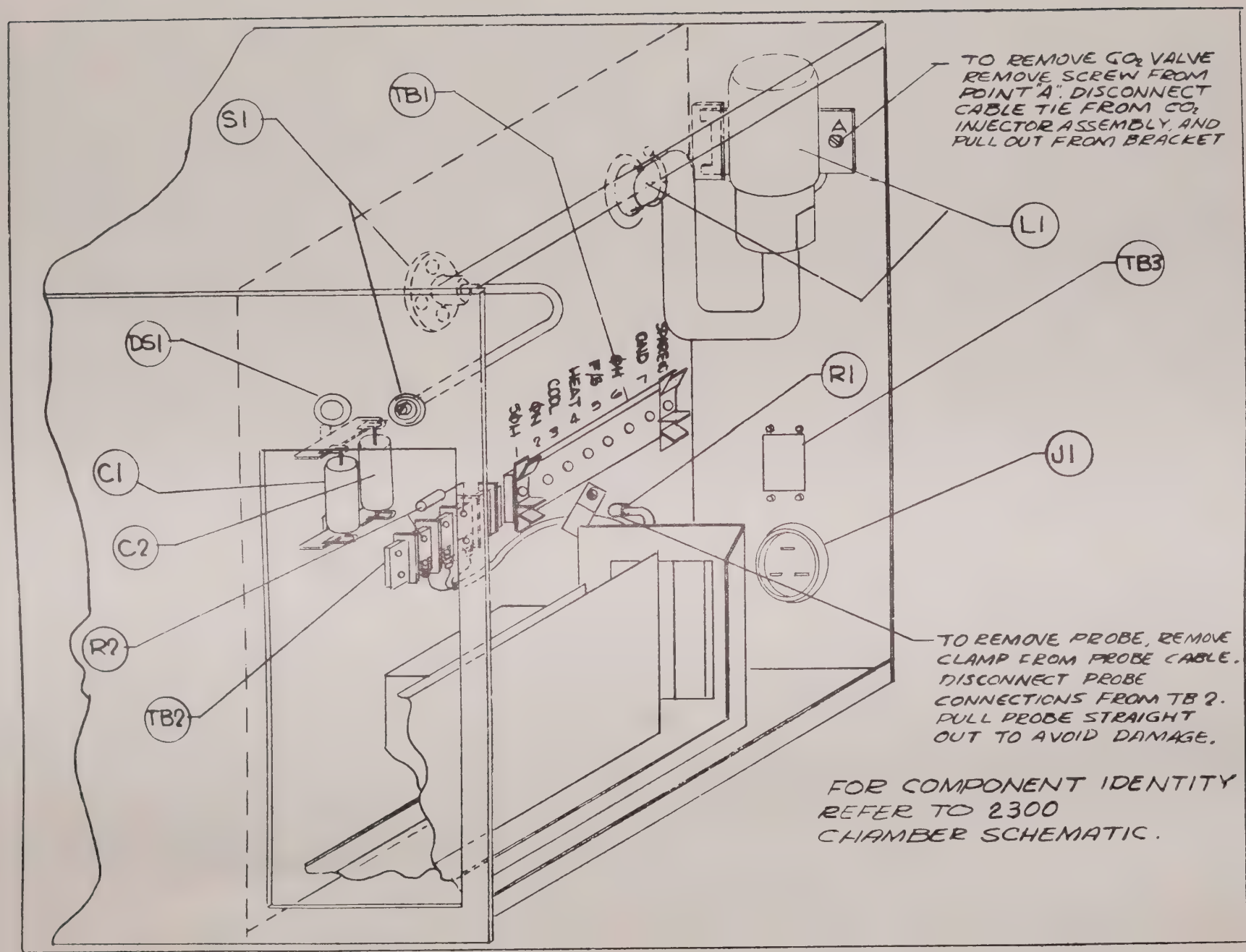

TO REMOVE CO_2 VALVE REMOVE SCREW FROM POINT "A". DISCONNECT CABLE TIE FROM CO_2 INJECTOR ASSEMBLY, AND PULL OUT FROM BRACKET
S1
TB1
L1
TB3
DS1
R1
C1
J1
C2
R2
TB2
TO REMOVE PROBE, REMOVE CLAMP FROM PROBE CABLE. DISCONNECT PROBE CONNECTIONS FROM TB 2. PULL PROBE STRAIGHT OUT TO AVOID DAMAGE.
FOR COMPONENT IDENTITY REFER TO 2300 CHAMBER SCHEMATIC.

FIGURE 5

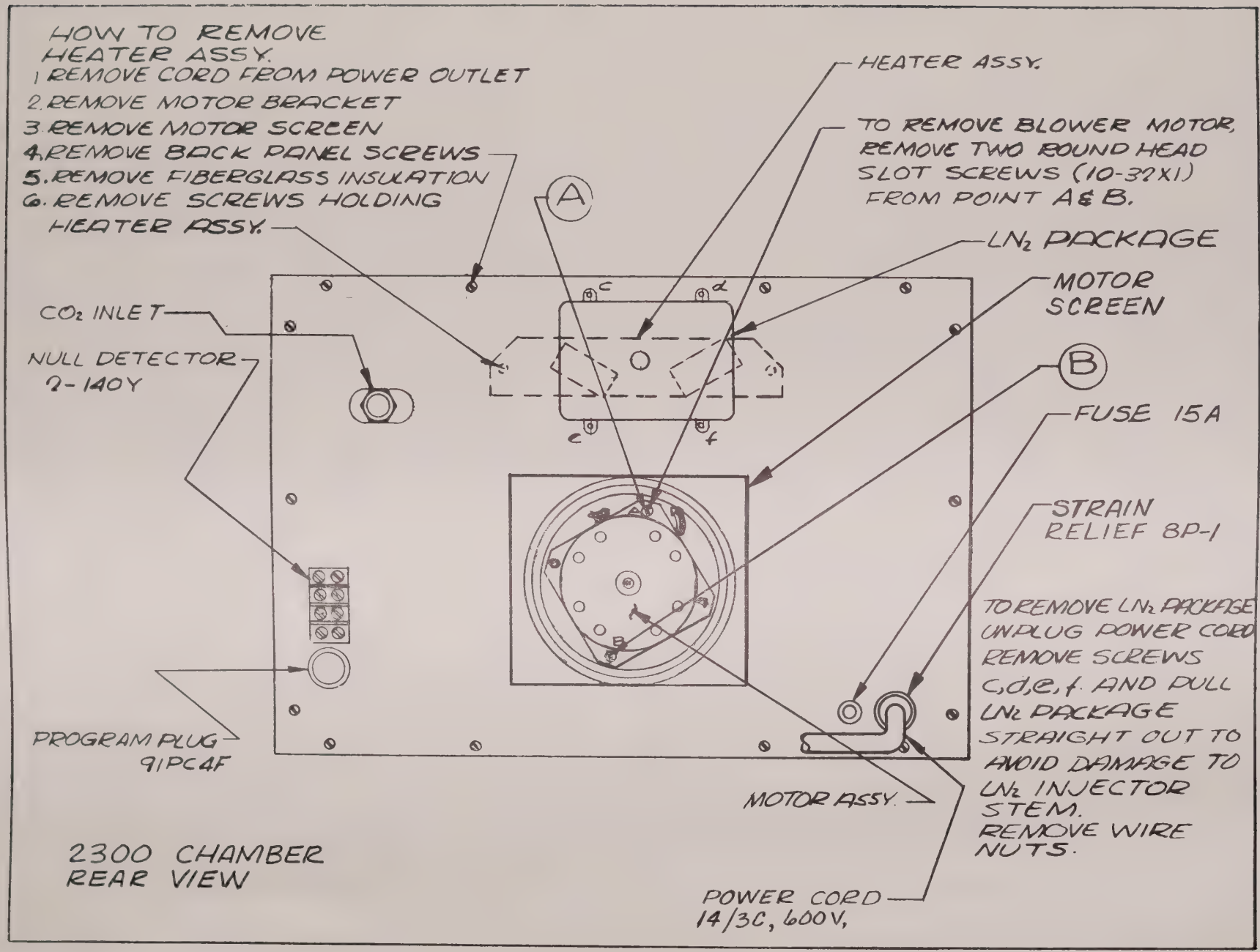
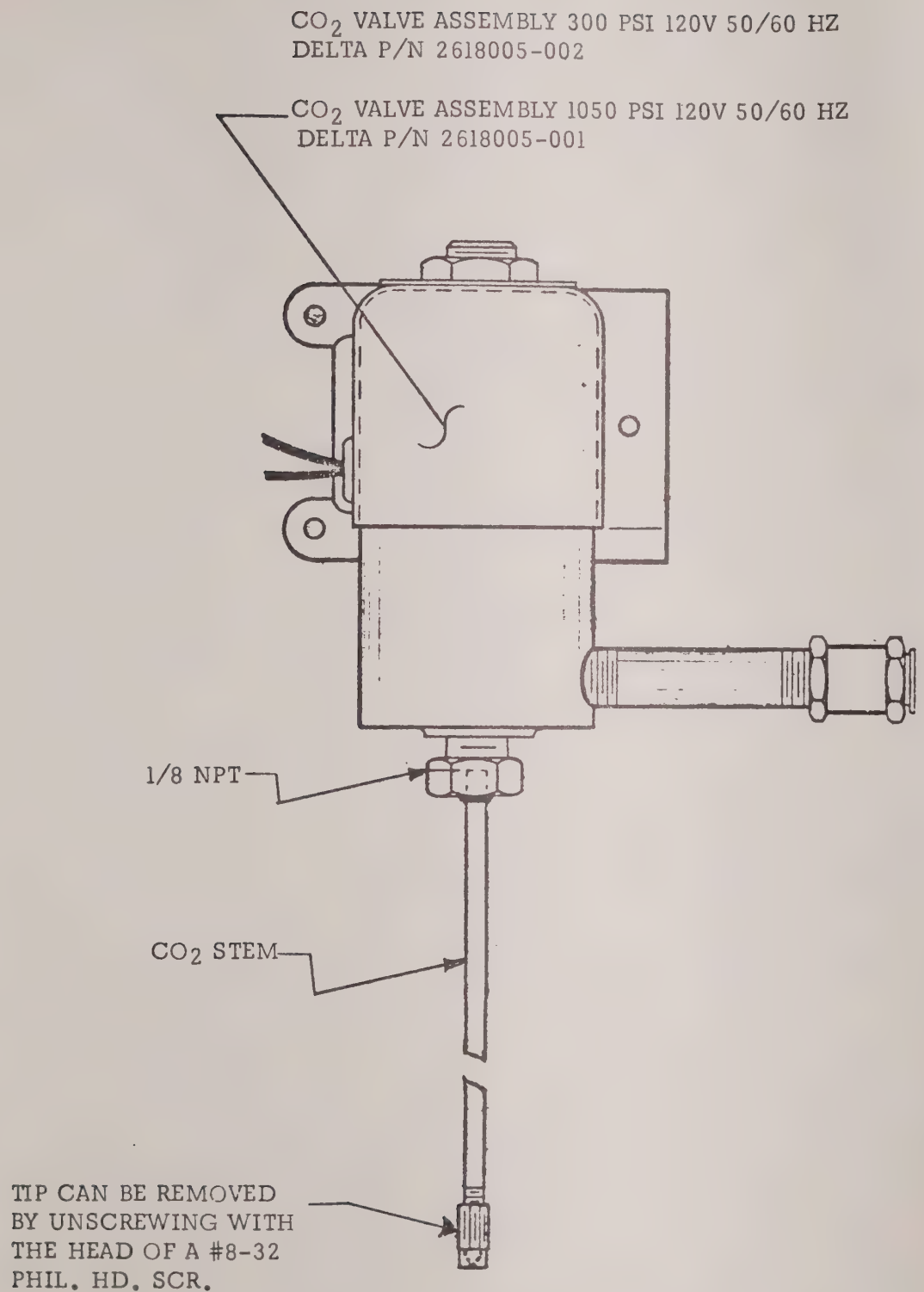
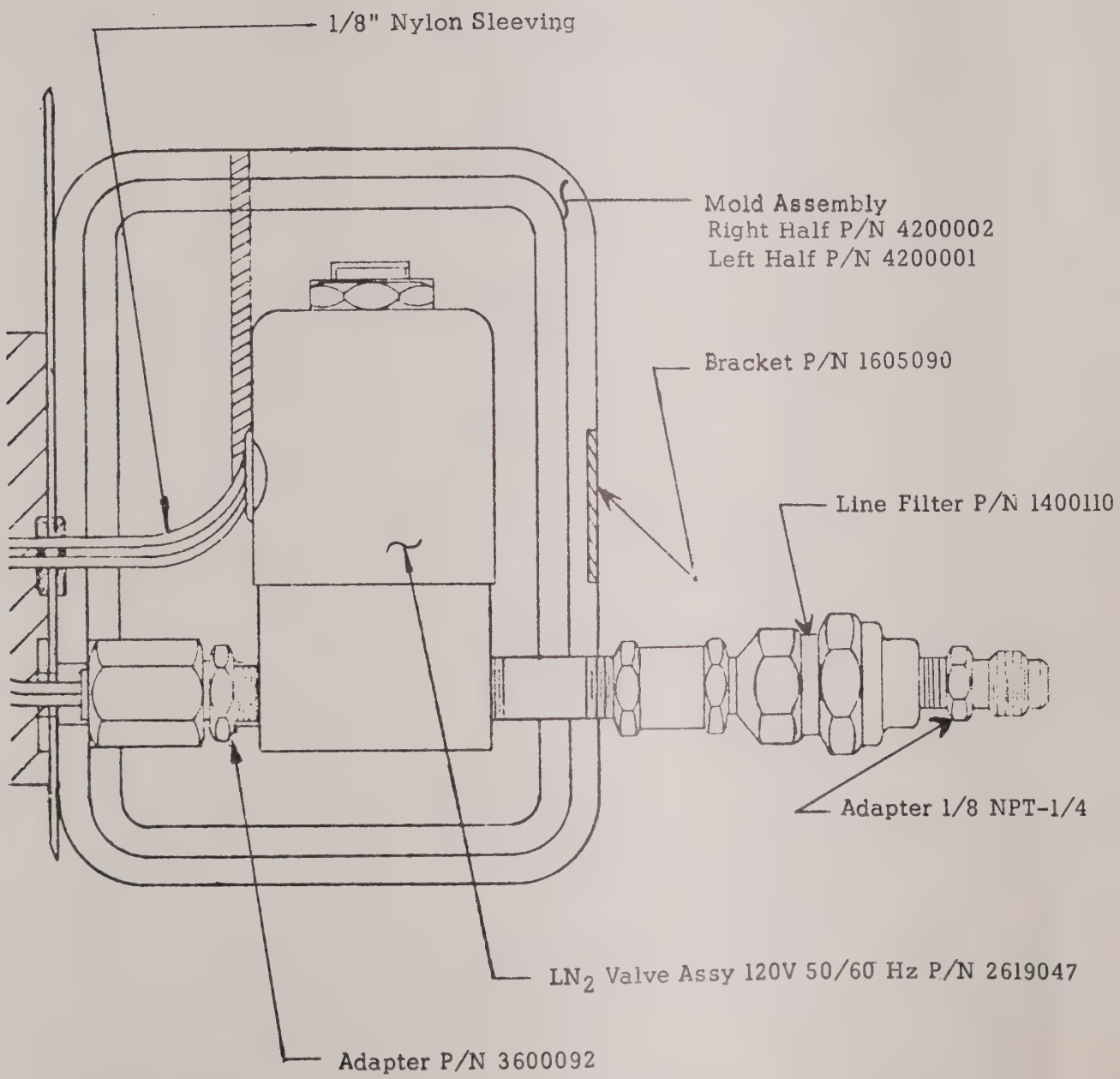

HOW TO REMOVE HEATER ASSY.
1 REMOVE CORD FROM POWER OUTLET
2. REMOVE MOTOR BRACKET
3. REMOVE MOTOR SCREEN
4. REMOVE BACK PANEL SCREWS
5. REMOVE FIBERGLASS INSULATION
6. REMOVE SCREWS HOLDING HEATER ASSY.
HEATER ASSY.
TO REMOVE BLOWER MOTOR, REMOVE TWO ROUND HEAD SLOT SCREWS (10-32X1) FROM POINT A & B.
A
LN2 PACKAGE
MOTOR SCREEN
CO2 INLET
NULL DETECTOR 2-140Y
B
FUSE 15A
STRAIN RELIEF 8P-1
TO REMOVE LN2 PACKAGE UNPLUG POWER CORD REMOVE SCREWS C,d,e,f. AND PULL LN2 PACKAGE STRAIGHT OUT TO AVOID DAMAGE TO LN2 INJECTOR STEM. REMOVE WIRE NUTS.
PROGRAM PLUG 91PC4F
MOTOR ASSY.
POWER CORD 14/3C, 600V,
2300 CHAMBER REAR VIEW

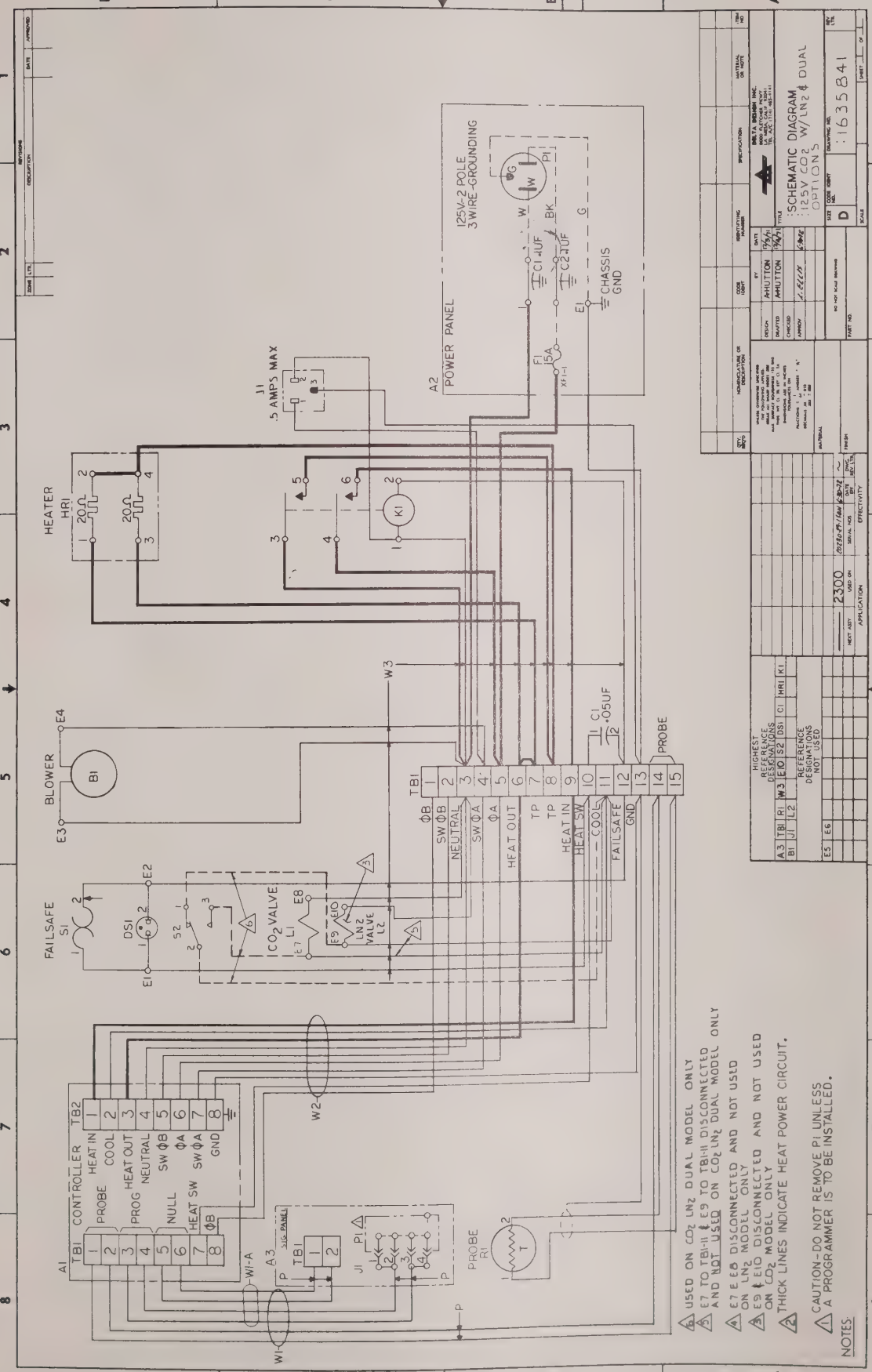
FIGURE 6

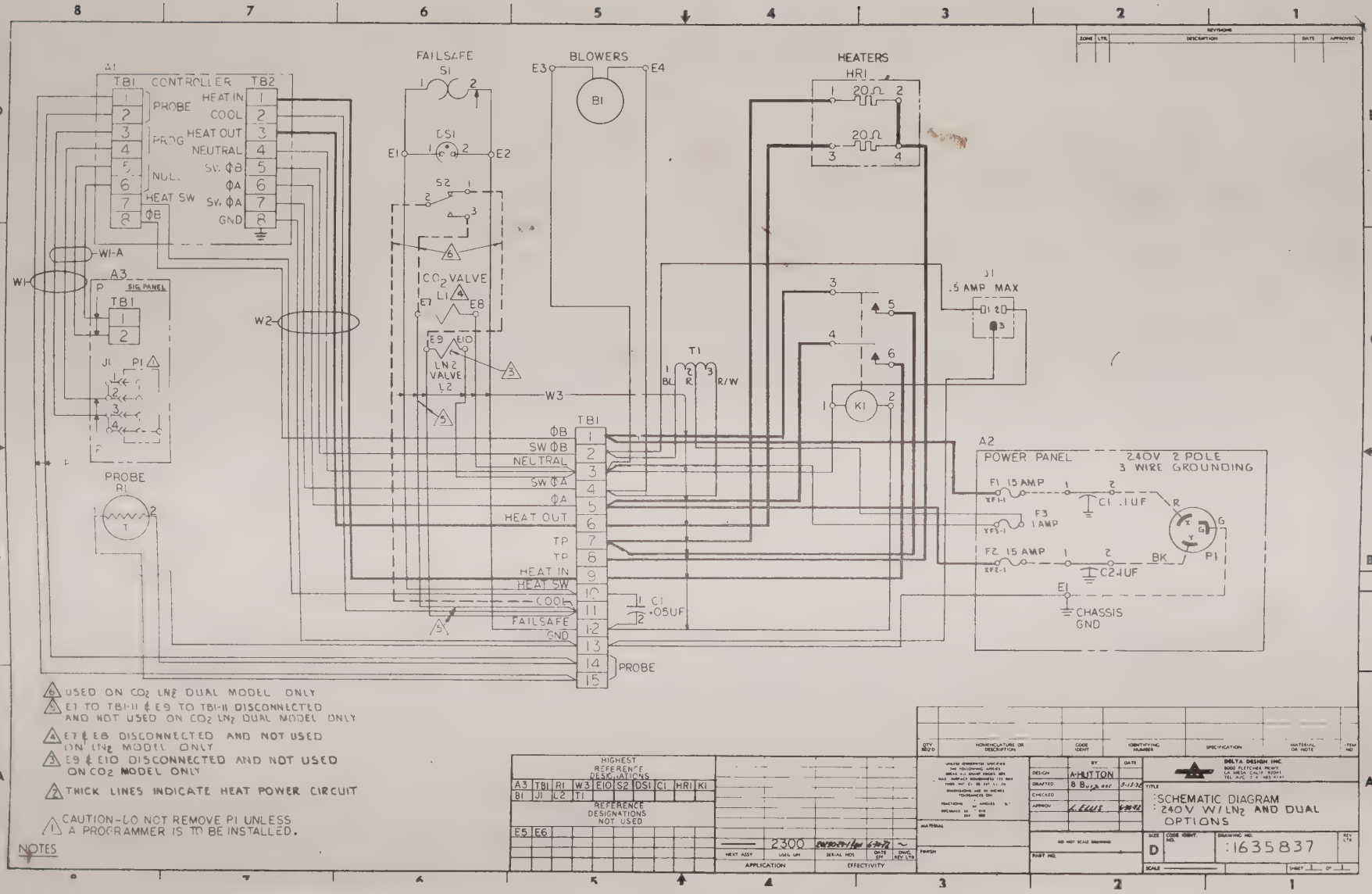

CO_2 VALVE ASSEMBLY 300 PSI 120V 50/60 HZ
DELTA P/N 2618005-002
CO_2 VALVE ASSEMBLY 1050 PSI 120V 50/60 HZ
DELTA P/N 2618005-001
1/8 NPT
CO_2 STEM
TIP CAN BE REMOVED
BY UNSCREWING WITH
THE HEAD OF A #8-32
PHIL. HD. SCR.

CO_2 VALVE ASSEMBLY



LN_2 VALVE ASSEMBLY


SCHEMATIC DIAGRAM
125V CO2 W/LN2 DUAL OPTIONS
DRAWING NO. 16355841
A1 CONTROLLER
A2 POWER PANEL
A3 LIQ. PANEL
125V-2 POLE 3 WIRE-GROUNDING
CHASSIS GND
HEATER HR1
BLOWER B1
FAILSAFE S1
CO2 VALVE L1
LN2 VALVE L2
PROBE R1
J1 5 AMPS MAX
F1 15A
C1 .05UF
C1 .1UF
C2 .1UF
K1
TB1
TB2
PROBE
HEAT IN
COOL
HEAT OUT
NEUTRAL
SW ΦB
ΦA
SW ΦA
GND
PROG
NULL
HEAT SW
W1
W2
W3
W1-A
P1
NOTES:
1. CAUTION-DO NOT REMOVE P1 UNLESS A PROGRAMMER IS TO BE INSTALLED.
2. THICK LINES INDICATE HEAT POWER CIRCUIT.
3. E7 & E8 DISCONNECTED AND NOT USED ON LN2 MODEL ONLY
4. E9 & E10 DISCONNECTED AND NOT USED ON CO2 MODEL ONLY
5. E7 TO TB1-11 & E9 TO TB1-11 DISCONNECTED AND NOT USED ON CO2 LN2 DUAL MODEL ONLY
6. USED ON CO2 LN2 DUAL MODEL ONLY



6 USED ON CO_2 LN_2 DUAL MODEL ONLY

5 E7 TO TB1-11 & E9 TO TB1-11 DISCONNECTED AND NOT USED ON CO_2 LN_2 DUAL MODEL ONLY

4 E7 & E8 DISCONNECTED AND NOT USED ON LN_2 MODEL ONLY

3 E9 & E10 DISCONNECTED AND NOT USED ON CO_2 MODEL ONLY

2 THICK LINES INDICATE HEAT POWER CIRCUIT

1 CAUTION-DO NOT REMOVE P1 UNLESS A PROGRAMMER IS TO BE INSTALLED.

NOTES

HIGHEST REFERENCE DESIGNATIONS

A3	TB1	R1	W3	E10	S2	DS1	C1	HR1	K1
B1	J1	L2	T1						

REFERENCE DESIGNATIONS NOT USED

E5	E6

QTY REQ'D	NOMENCLATURE OR DESCRIPTION	CODE IDENT	IDENTIFYING NUMBER	SPECIFICATION	MATERIAL OR NOTE	ITEM NO

	BY	DATE
DESIGN	A. HUTTON	
DRAFTED	B. B.	3-11-76
CHECKED		
APPROV	A. ELLIS	3-11-76

MATERIAL

FINISH

DO NOT SCALE DRAWING

PART NO.

DELTA DESIGN INC.
8000 FLETCHER PKWY
LA MESA CALIF 92041
TEL A/C 714 465 9141

TITLE: SCHEMATIC DIAGRAM 240V W/LN2 AND DUAL OPTIONS

SIZE D | CODE IDENT. NO. | DRAWING NO. 1635837 | REV LTR

SCALE | SHEET 1 OF 1

2300 EFFECTIVITY

NEXT ASSY | USED ON | SERIAL NOS. | DATE OFF | DWG REV LTR

APPLICATION

RM 4-17-72

DELTA DESIGN, INC.
5725 KEARNY VILLA RD
SAN DIEGO, CA. 92123
TEL. (714) 292-5000

NOTES: SH 1-3 "E" SIZE, SH 4 "D" SIZE, SH 5 "A" SIZE

1. THESE DWGS ARE FOR OPTIONAL EQUIP. ONLY AND ARE NOT PART OF BASIC CHAMBER ASSY.
2. INDICATED ON SHEET 5 OF DWG.

2300-0873

#	QTY	DRAWING NUMBER	DESCRIPTION	MANUFACT AND NO.	STK OR PART NO.	FAB CODE
00		E 2605110	CHAMBER ASSY		2605110	16
00		D1635841	SCHEMATIC (REF)			80
00		D1635837	SCHEMATIC (REF) 240 VAC			80
00		C2635836	125 VAC TO 240 VAC CONVERSION (REF)			16
00		C2635835	CO_2 TO LN_2 CONVERSION (REF)			16
00		C2635834	DUAL CONVERSION (REF)			16
00		E1600040	PANEL, FRONT (RACK) (REF)			11
01	1	D2631670	INNERLINER ASSY		2631670	16
02	1	D2600032	PANEL ASSY, BOT		2600032	11
03	1	E1600033	PANEL, REAR		1600033	11
04	1	D2600034	PANEL ASSY, RIGHT SIDE		2600034	11
05	1	E1602971	PANEL, FRONT BENCH		1602971	11
06	1	D1634083	PANEL, LEFT SIDE		1634083	11
07	1	D1634084	PANEL, TOP		1634084	11
08	1	C2600002	BEZEL ASSY		2600002	11
09	1	D2635393	PARTITION		2635393-001	11
10	1	A2635264-004	CABLE ASSY W1		2635264-004	27
11	1	A2635265-002	CABLE ASSY W2		2635265-002	27
12	1	A1602967	OUTER PLATE, VENT		1602967	21
13	1	A1602968	GASKET, VENT		1602968	21
14	1	A1602969	VENT, INNER PLATE		1602969	21
15	8		GASKET, CORNER		2400018	90
16	2	C1635605 —	LATCH KEEPER		1635605 —	70
17	1	D2621006	MOTOR BLOWER B1		2621006	70
18	2	B1600091	SHIM, KEEPER		1600091	21
19	1		OUTLET, CONVENIENCE J1		1500083	70

REV	DATE	BY	APP'D	DESCRIPTION
F	11-3-73	KNAPP	EH	PER ECN M1239
C	11-20-72	R.B.	L.ELLIS	ITEM 00 WAS D2605110
				ITEM 59 WAS; SCREW #6-32 x 1/2 FHPM
				ADDED ITEM 44
D	12-22-72	R Brooks	L. Ellis	ADDED ITEMS 68 & 69
				ITEM 33 PROBE STOCK NO. WAS 2300031
E	3-28-73	F COLEMAN		ADDED DASH NOS. TO ITEMS 11, 10 & 34 ECN M211

TITLE: CHAMBER ASSEMBLY - MODEL 2300

NEXT ASSY P/L: END ITEM

BY	D. HAWN	6-5-72
CHK'D	Hawn	11-30-72
APP'D	L. ELLIS	6-29-72

P/L 2605110 REV F SHT 1 OF 3

DELTA DESIGN, INC. | Parts List No. 2605110 | Sheet 2 of 3

2300-0873

Item	Qty.	Drawing Number	Description	Manufacturer and Part No.	Stock No.	F. S. Code
20	4		FOOT, RUBBER		1500416	70
21	AR		INSUL, FIBERGLAS		2400025	90
22	AR		INSUL, PRESSTITE		2400026	90
23	1	B2602503	THERMOSWITCH ASSY S1		2300004	70
24	1		LAMP, NEON DS1		1400082	70
25	1		RELAY K1		1400218	70
26	1		CAPACITOR, .05 uF, 400V C1		077520-400	70
27	1	C2622521	HEATER ASSY HR1		2622521	26
28	1	B2618016	CO_2 ASSEMBLY L1		2618016-001	16
29	1		TERMINAL BLOCK TB1		1400572	70
30	1	B2635055	PANEL ASSY, SIG A3		2635055	26
31	1	C2635058	PANEL ASSY, PWR A2		2635058	26
32	1		FUSE, 15 A A2-F1		1400037	70
33	1		PROBE R1		2300032	70
34	1	A2635833-001	CABLE ASSEMBLY W3		2635833-001	27
35	1		GROMMET, 1/2		1500032	90
36	6		(2) WIRE NUT, SMALL E1 THRU E4, E7, E8		1500188	90
37	6		CABLE TIE		1500013	90
38	6		PUSH MOUNT		1500014	90
39	1		PLUG (1/2 DIA HOLE)		3600081	90
40	1		PLUG (1-1/4 DIA HOLE)		1700142	90
41	4		SPACER (.50 LONG)		4100093	21
42	4		SCREW, #4 x 1/2 PHPSM			90
43	4		GASKET, STRIPS		2400024	90
44	1		FLEXIDRIVE		1500451	70
45	2		SOLDERLESS TERMINAL (RING)		1500062	70
46	1		SOLDERLESS TERMINAL, SPADE		1500055	90
47	2		(2) SOLDERLESS TERMINAL, RECEPT.		1500047	90
48	AR		WIRE 14 AWG (TEFLON)		1500380	90
49	AR		WIRE 14 AWG	COHU STOCK	7700614-999	90
50	AR		WIRE 20 AWG	COHU STOCK	7700620-999	90
51	1		PLUG (3/8 DIA HOLE)		3600082	70
52	8		SCREW # 6-32 x 3/8 PHPM			
53	14		SCREW # 6-32 x 1/2 PHPM			
54	6		SCREW # 6-32 x 1.00 PHPM			

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DELTA DESIGN, INC. | Parts List No. 2605110 | Sheet 3 of 3

2300-0873

Item	Qty.	Drawing Number	Description	Manufacturer and Part No.	Stock No.	Fab. Code
55	24		SCREW #6 x 1/2 PHPSM			90
56	4		SCREW #8-32 x 3/4 PHPM			90
57	9		SCREW #8-32 x 3/4 OHSM			90
58	4		SCREW #10-32 x 1/2 PHPM			90
59	14		SCREW #6 x 82° x 1/2 OHPSM		6906122-200	90
60						
61	4		WASHER, #10 LOCK			90
62	7		WASHER #6 LOCK			90
63						
64						
65						
66						
67	4		NUT #6 HEX			
68	1		NUT		1500735	
69			BUSHING		4100003	
70	1					
71		A1636422	LABEL, PRESS. SENSITIVE		1636422	22

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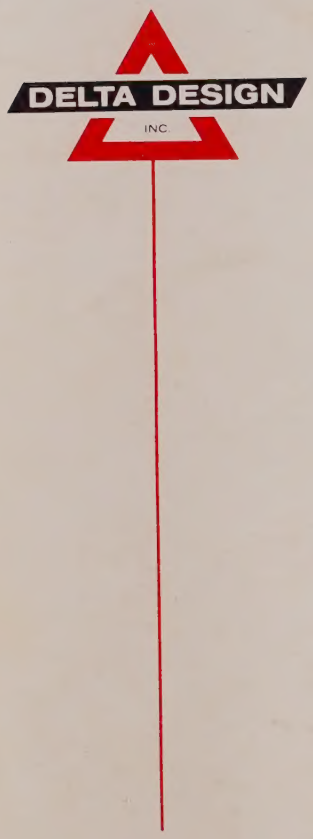

SAN DIEGO, CALIFORNIA

MP MASTER
MA32420